JVC

SERVICE MANUAL

CHARACTER GENERATOR

CG-P50E

SPECIFICATIONS

Number of characters	: 46
Display capacity	: Maximum 60 characters (12 characters x 5 lines)
Character sizes	: 4 different sizes (small, medium, large, extra-large)
Number of pages	: 2 scroll pages, 4 zoom pages and 8 standard title pages
Lap timer	: Counts in 1/100 sec (up to 9 hours 59 minutes 59 seconds 99)
Memory	: One-year backup with two disc-batteries
Power supply	: DC 8 – 8.5 V ⎓ for operation (supplied from camera) DC 3.0 V ⎓ for memory (supplied from two LR-43 disc-batteries)
Dubbing	: Possible through VIDEO IN/OUT connectors
Power consumption	: 255 mW
Dimensions	: 57(W) x 26.5(H) x 137(D) mm
Weight	: 115 g (including batteries)
Accessories	: Cable (8-pin, 30 cm) x 1 Cable (RCA pin-BNC, 2.5 m) x 2 Alkaline-manganese battery LR-43 x 2

Design and specifications subject to change without notice.

No. 8342
April 1984

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

• Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

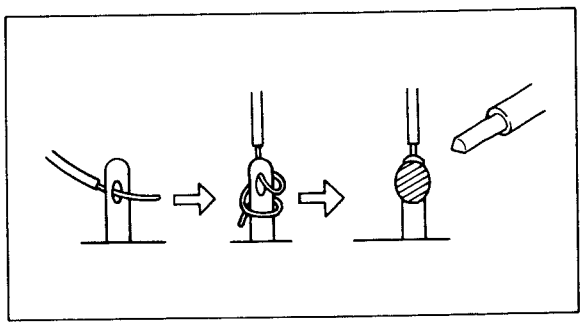


Fig. 1

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

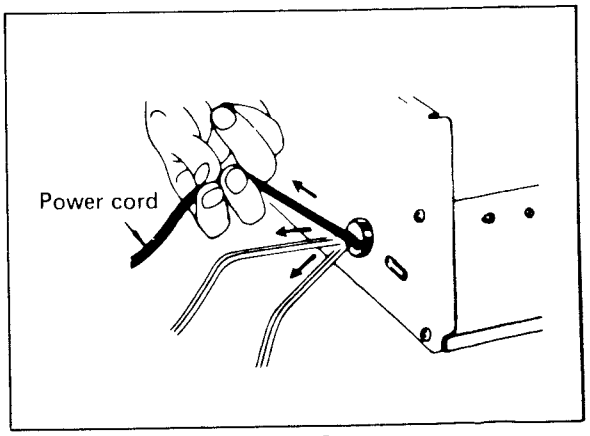


Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the parts specified. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1. Connector part number : E03830-001
2. Required tool : Connector crimping tool of the proper type which will not damage insulated parts.
3. Replacement procedure

   1) Remove the old connector by cutting the wires at a point close to the connector.
   Important : Do not reuse a connector (discard it).
   2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
   3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
   4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.
   5) Check the four points noted in Fig. 7.

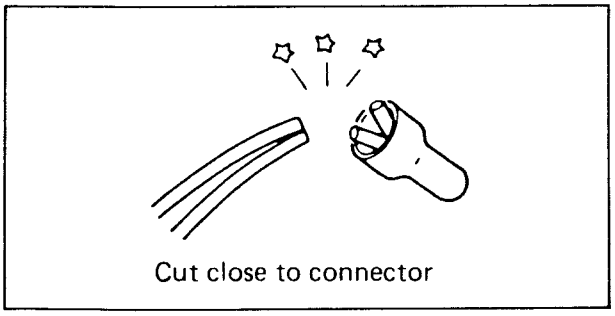


Fig. 3

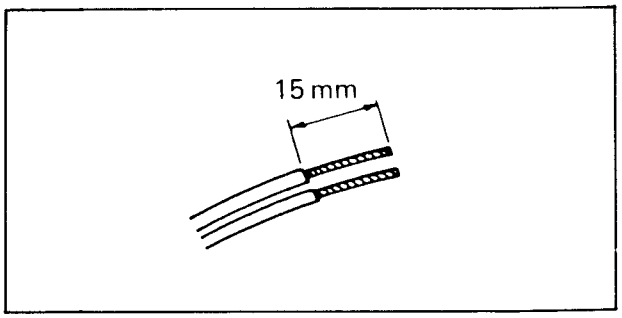


Fig. 4

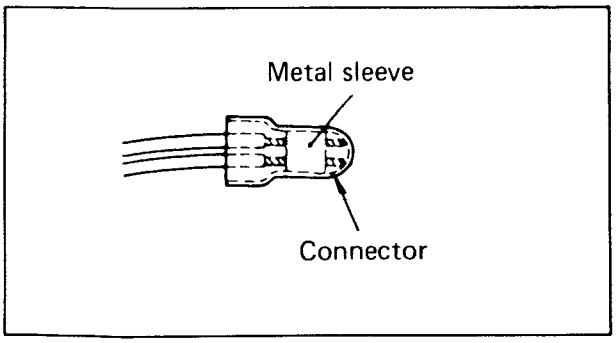


Fig. 5

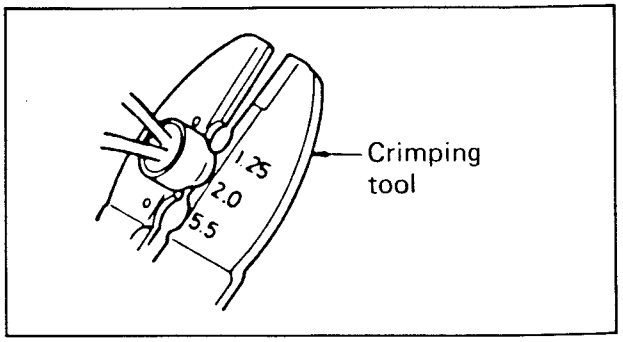


Fig. 6

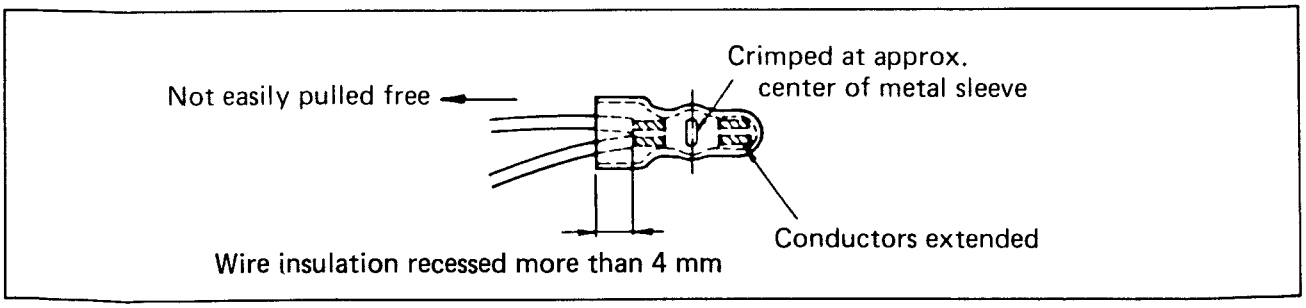

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) See table below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d),(d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

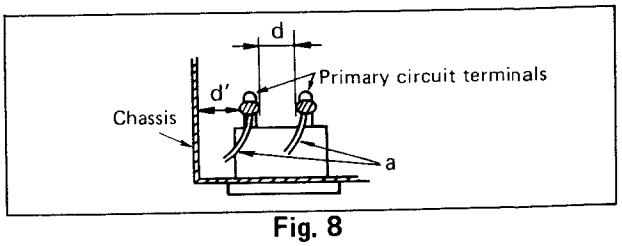


Fig. 8

Table 1: Ratings for selected areas

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance(d),(d')
100 V	Japan	≧ 1 MΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	– – –	900 V 1 minute	≧ 3.2 mm
* 110 to 130 V 200 to 240 V	Europe Australia	≧ 10 MΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

* Class II model only.
Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

4. **Leakage current test**
   Confirm specified or lower leakage current between B(earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

   Measuring Method: (Power ON)
   Insert load Z between B(earth ground,power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

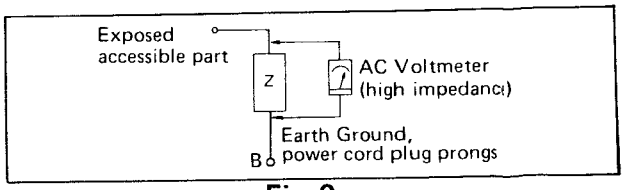


Fig. 9

Table 2: Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
100 V	Japan	1 kΩ	i ≦ 1m A rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5m A rms	Exposed accessible parts
110 to 130 V 200 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 m A peak i ≦ 2 m A dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 m A peak i ≦ 2 m A dc	Other terminals

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

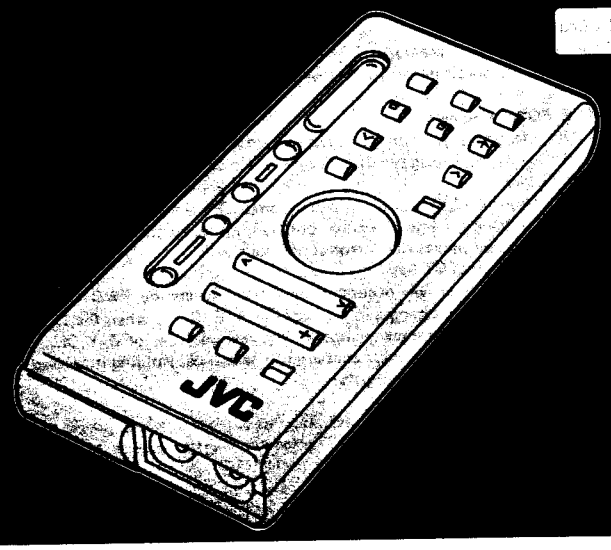
MANUEL D'INSTRUCTIONS/BEDIENUNGSANLEITUNG

JVC

CG-P50 CHARACTER GENERATOR

GENERATEUR DE CARACTERES
ZEICHENGENERATOR

Specifically for the CG-P50E
Uniquement pour le CG-P50E
Bedienungsanleitung fur
das Modell CG-P50E



PU30425 615

Thank you for purchasing the CG-P50E Character Generator. Impressive titles superimposed over the scene will provide an informative part of your video recording. Dating is another useful means of keeping track of all your video recordings. When you are recording some sporting event, displaying of the lap time will create dramatic impact. This character generator has been designed to introduce a variety of titling techniques that will give your video productions a more polished, professional appearance.

To take best advantage and gain the most service from the CG-P50E, read this instruction booklet carefully and thoroughly.

This character generator should be used with JVC video cameras. It is not compatible with video cameras of other brands.
- Some JVC video cameras cannot be used with the CG-P50E.
- The JVC GZ-S3E and GX-S9E can be used only when introducing titles in tape-to-tape transfer.

FEATURES

- Titles, dates and lap time can be superimposed on the scene being shot with a JVC video camera (specified models only).
- Generates a total of 46 different characters; 26 letters of the alphabet, 3 German-alphabet letters, 10 numerals and 7 punctuation marks.
- Characters of 4 different sizes can be selected.
- Up to 60 characters can be displayed on the screen at a time (5 lines of 12 characters each).
- Title scrolling up or down is possible, with one scroll page storing up to a maximum of 37 lines of 12 characters each.
- Zooming of the title from small to extra-large or vice versa is possible, beginning from or ending at either the upper left corner or the centre of the screen.
- Scrolling direction can be reversed with the reverse switch.
- Scrolling speed can be adjusted in 5 steps.
- A total of 14 pages of text (8 still title pages, 4 zoom title pages and 2 scroll title pages) can be stored in memory indefinitely with batteries replaced once a year.
- Video input/output connectors allow inserting titles, dates and lap time during tape-to-tape dubbing.

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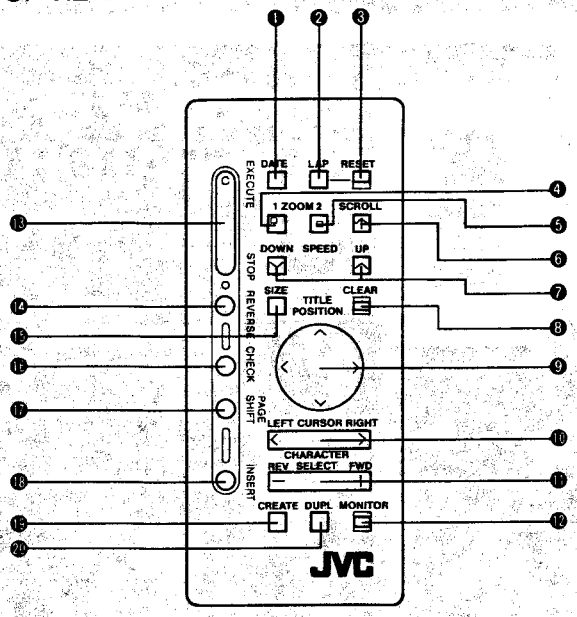
CONTROLS AND CONNECTORS

TOP VIEW



❶ DATE key
To display a date. To cancel the display, press again.

❷ LAP key
To display lap time. To cancel the display, press again.

❸ RESET key
To reset the lap time reading to "00:00:00".

❹ ZOOM 1 key (Corner zoom key)
To zoom up the title from the upper left corner or to zoom back the title to the upper left corner.

❺ ZOOM 2 key (Centre zoom key)
To zoom up the title from the centre or to zoom back the title to the centre.

❻ SCROLL key
To call up a scroll title page. First page S1 is called up. To call up page S2, press this key again. Pressing it once again changes back to S1.

❼ Scroll SPEED keys
Scroll speed is adjustable in 5 steps.
DOWN: Each pressing decreases the scroll speed by one step. Pressing five times provides the slowest speed.
UP: Each pressing increases the scroll speed by one step. Pressing five times provides the fastest speed.

❽ CLEAR key
To erase the title in memory. Clearing the memory is performed page by page. With the scroll pages, the 4 lines appearing on the screen are erased at a time.

❾ TITLE POSITION key
To shift the composed title to different areas on the screen. Press the part of the key indicating the direction in which the title is to move.

❿ CURSOR key
To determine the cursor position when composing a title. Pressing once moves the cursor by one character position, either to the right or left. Holding it pressed moves the cursor continuously.

⓫ CHARACTER SELECT key
To select a character when composing a title. When the FWD side is pressed, the character changes in the order of A, B, C . . ; when the REV side is pressed, the character changes in the reverse order of Z, Y, X . . . Pressing once calls up the next character in sequence. Holding it pressed changes the character continuously.

⓬ MONITOR key
Press the CREATE key while holding this MONITOR key pressed in order to observe on the screen of a connected TV the title as it is being composed.

⓭ EXECUTE/STOP key
To start or stop the lap time, or to start or stop scrolling.

⓮ REVERSE key
To reverse the scrolling direction; from upward to downward or from downward to upward.

⓯ SIZE key
To select the character size. Four character sizes are available; small, medium, large and extra-large. Pressing once changes the size by one step. Holding the key pressed changes the character size continuously.

⓰ CHECK key
This key has two functions:
(1) To check the contents of each page. Each time this key is pressed, the composed title is displayed for one second.
(2) To make the title disappear from the screen.

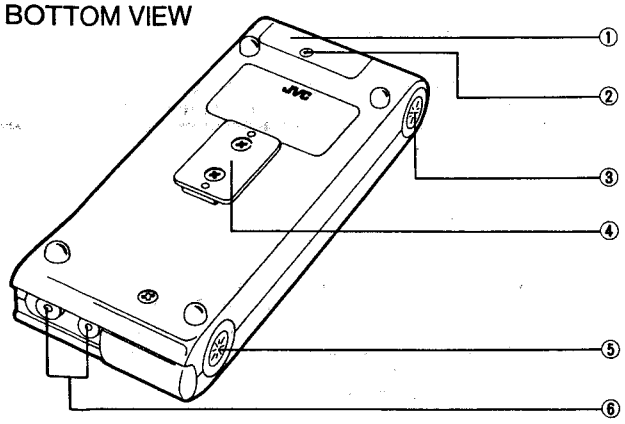
⓱ PAGE SHIFT key
To call up a page (except scroll pages). Pressing once shifts one page. Holding it pressed advances the pages in the sequence of P1, P2, . . . P8, Z1, Z2, . . . Z4.

⓲ INSERT key
To record the composed title.

⓳ CREATE key
To start composition of a title.

⓴ DUPL key
If you need the same character in subsequent positions while composing a title, press this key. The same previous character will appear in the cursor position. Holding it pressed allows multiple repeats of the same character. This key is also useful to call up the desired character faster.

BOTTOM VIEW



① **Battery compartment**
Insert two disc batteries LR-43 (provided).

② **Battery compartment cover attachment screw**
To replace the batteries, unscrew this for removing the cover.

③ **Camera connector**
Connect the grey plug of the provided cable.

④ **Accessory shoe mounting base**
For mounting into the camera's accessory shoe or the accessory shoe adapter.

⑤ **Viewfinder connector**
Connect the viewfinder cable.

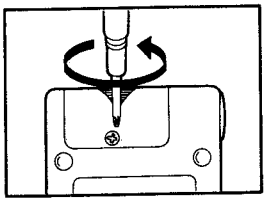
⑥ **Video input/output connectors**
Used to insert titles, dates and lap time in tape-to-tape transfer.

FUNCTIONS OF EACH TITLE PAGE

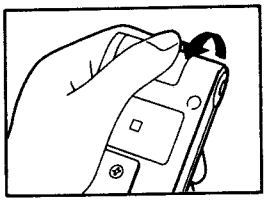
The CG-P50E holds 14 different pages in memory. Each page has different functions. Call up an appropriate page referring to the following chart.

Description of page		Date/lap page	Standard title page	Zoom title page	Scroll title page
Page identification		P1	P2 – P8	Z1 – Z4	S1, S2
No. of pages		1	7	4	2
Call-up key		PAGE SHIFT key			SCROLL key
Contents to be inserted	Date	YES	NO	NO	NO
	Lap time	YES (9 hr 59 min 59 sec 99)	NO	NO	NO
	Title	YES	YES	YES	YES
Character size and maximum display capacity	Small	3 lines x 12 characters	5 lines x 12 characters	3 lines x 7 characters (variable from small to extra-large or vice versa)	37 lines x 12 characters
	Medium	NO	5 lines x 12 characters		37 lines x 12 characters
	Large	NO	4 lines x 8 characters		NO
	Extra-large	NO	3 lines x 7 characters		NO
Title position shifting		NO	YES	NO	YES
Zooming		NO	(Manual zoom with SIZE key)	YES	NO
Scrolling		NO	NO	NO	YES

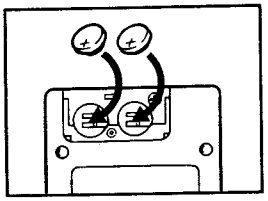
INSTALLING THE BATTERIES



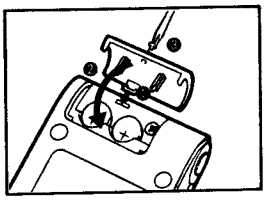
Remove the screw on the battery compartment cover using a phillips screwdriver.



Remove the cover by pushing it in the direction of the arrow.



Insert the two provided disc-batteries (LR-43) into the battery compartment with their "+" side upward and slightly inclined. Then position them horizontally by applying some pressure.



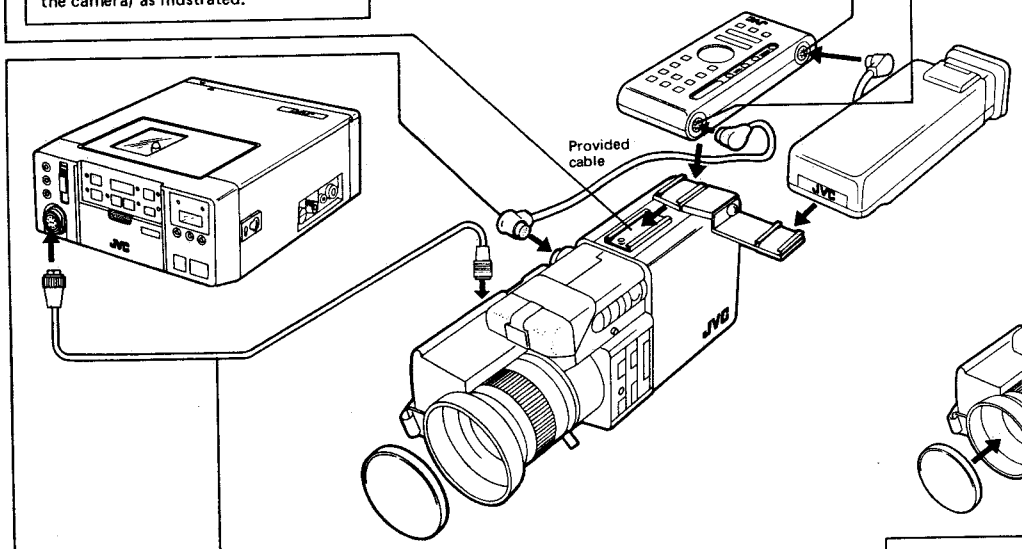
❶ Align the boss on the cover into the recess of the compartment.
❷ Install the cover from above.
❸ Replace and tighten the screw.

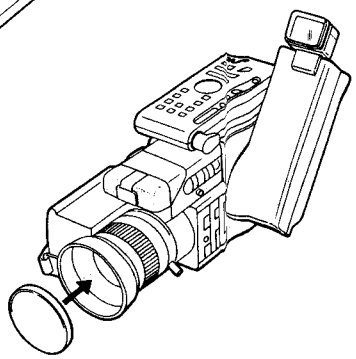
CONNECTION

1 When using the JVC GZ-S5E camera, mount the character generator and the viewfinder on the camera using the accessory shoe adapter (provided with the camera) as illustrated.

2 Connect the viewfinder cable to the character generator's viewfinder connector.

3 Connect the grey plug of the provided cable to the character generator's grey socket (camera connector).





When composing a title on the viewfinder screen, adjust the viewfinder angle as illustrated for better viewability.
It is recommended that the lens be capped to improve readability.

4 Connect the black plug of the provided cable to the camera's viewfinder connector.

5 Connect the camera to the video cassette recorder.

OPERATION OF THE KEYS FOR COMPOSING TEXTS

CURSOR LEFT/RIGHT KEY

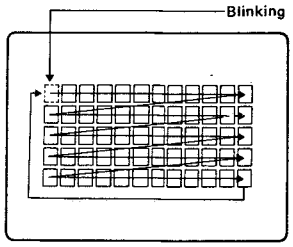
This key is used to move the cursor (i.e. blinking character position) for composing texts.

Press the RIGHT side of the CURSOR key to move the cursor to the right.
- After the rightmost character position, the cursor moves to the first character position on the next line below.
- After the last character position on the bottom line, the cursor moves to the first character position on the top line.

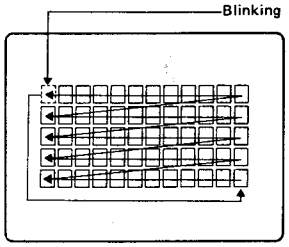
Press the LEFT side of the CURSOR key to move the cursor to the left.
- After the leftmost character position, the cursor moves to the last character position on the next line above.
- After the leftmost character position on the top line, the cursor moves to the last character position on the bottom line.

Holding the CURSOR key pressed moves the cursor continuously in the corresponding direction.

CURSOR RIGHT



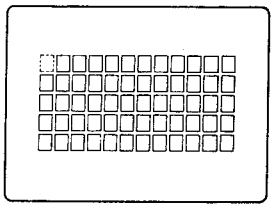
CURSOR LEFT



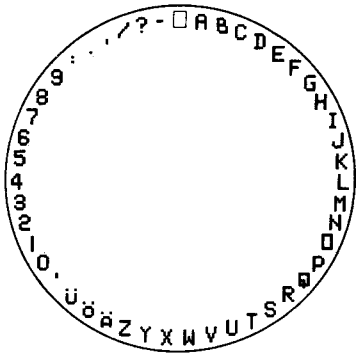
CHARACTER SELECT REV/FWD KEY

This key is used to call up a necessary character for the position where the cursor is located.

- The character can be entered only at the position where the cursor is located.



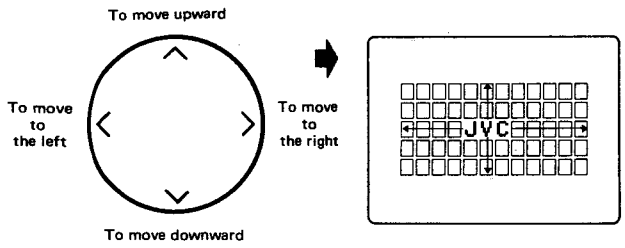
- 47 characters (including space) are arranged in the order illustrated here.
- To call up a character between A and W, pressing the FWD side of the key will reach it faster.
- To call up a character between "-" (hyphen) and X, pressing the REV side of the key will reach it faster.



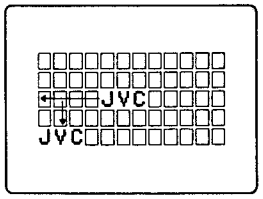
- When the FWD side of the key is pressed, the character changes in the order of A, B, C, ...
- When the REV side of the key is pressed, the character changes in the order of -, ? , /, ...
- Pressing once calls up the next character in sequence. Holding it pressed changes the character continuously.

TITLE POSITION KEY

This key is used to relocate the composed title at different areas on the screen. (Moving the title is possible even while recording.)
Titles on P1 and Z1 through Z4 cannot be shifted using the TITLE POSITION key.

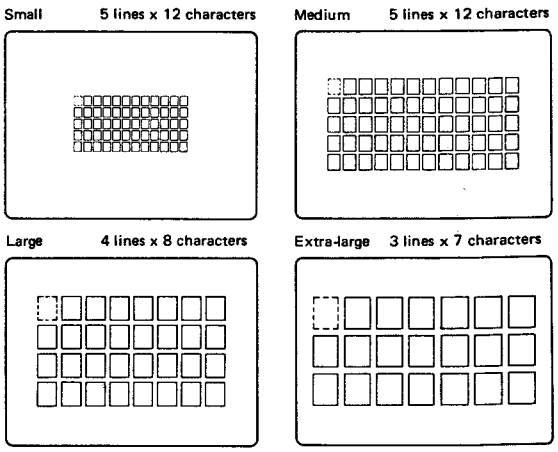


- It is not possible to move the title diagonally.
- To move the title to a diagonal position, first move it to the left (or right) and then upward (or downward).



SIZE KEY

This key is used to select the size of characters for a title on standard title pages (P2 to P8) or scroll title pages (S1 and S2). Four character sizes are selectable on standard title pages; small, medium, large and extra-large. On scroll pages, either small or medium characters can be used.


Small 5 lines x 12 characters
Medium 5 lines x 12 characters
Large 4 lines x 8 characters
Extra-large 3 lines x 7 characters

Pressing the key once changes the character size by one step; small, medium, large, extra-large, small, ... Holding the key pressed changes the character size continuously. (Characters might be distorted at the instant of size switching.)
- The character size can be changed even during recording.
- With scroll title pages, the character size cannot be changed while scrolling takes place. To change the size, stop scrolling, then press the SIZE key.

DUPL KEY

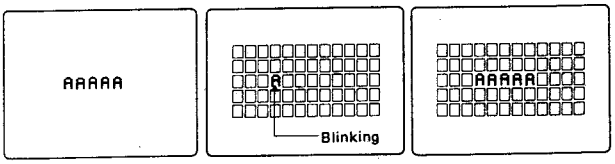
This key is used to repeat the same character in subsequent character positions. Because of this function, there are other ways to use this key effectively.

1 To repeat the same character

For example: to make a title AAAAA

① Call up A at the first required character position with the CHARACTER SELECT key.

② Press the DUPL key four times.



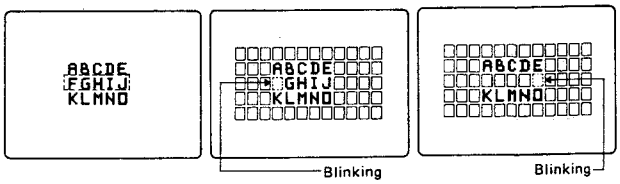
- Press the DUPL key for multiple repeats of this same character. Holding it pressed results in continuous repeats.

2 To erase one line of the composed text

For example: to erase the 2nd line of this text

① Call up a blank space at the position of F with the CHARACTER SELECT key.

② Press the DUPL key to repeat blank spaces to the position of J.



3 To call up a necessary character faster

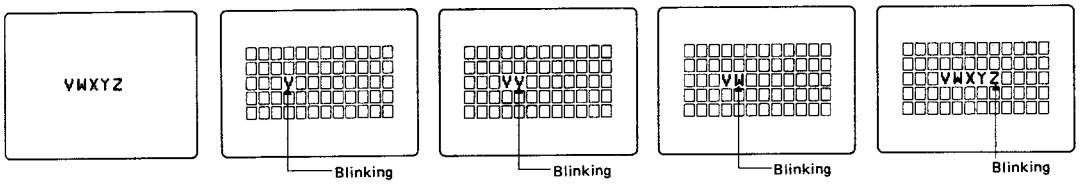
For example: to make a title VWXYZ

① Call up V at the first required character position with the CHARACTER SELECT key.

② Press the DUPL key. V appears in the next position.

③ Press the FWD side of the CHARACTER SELECT key once; W will appear in place of V.

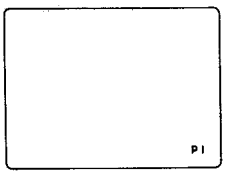
④ Call up X, Y and Z following the same procedure.



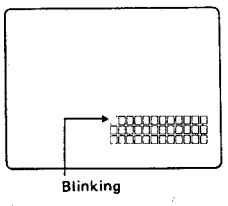
- After calling up the same character, you can also use the REV side of the CHARACTER SELECT key, depending on which direction the required character is reached faster.

HOW TO COMPOSE AND INSERT A DATE (P1)

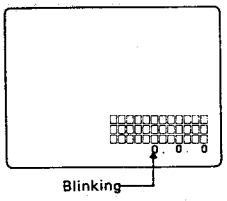
1 Switch recorder power on.
- Page number will be displayed.
- If the displayed page number is other than P1, call up P1 by pressing the PAGE SHIFT key.



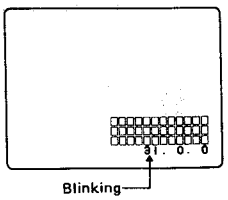
2 Press the CREATE key.
- Title zone will appear.
- If a no-longer-needed title appears, erase it by pressing the CLEAR key.



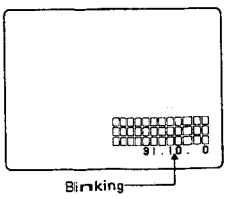
3 Press the DATE key.
- Date zone will appear at the bottom right corner and the first date position (day) will blink.
- Date zone may have appeared already in step 2 when the CREATE key is pressed. In such a case, press the DATE key twice; the first date position (day) will start blinking.



4 Enter the day by pressing the FWD side of the CHARACTER SELECT key.
(In this example, 31 has been entered.)

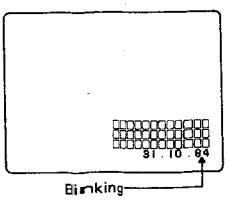


5 Press the RIGHT side of the CURSOR key once and enter the month by pressing the FWD side of the CHARACTER SELECT key.
(In this example, 10 is entered for October.)



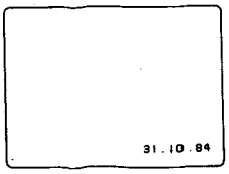
6 Press the RIGHT side of the CURSOR key once and enter the year using the CHARACTER SELECT key.
- To enter 84, pressing the REV side of the CHARACTER SELECT key provides the necessary numerals faster, because figures change in the order of 0, 99, 98, 97 . . . .

Note: 19 of 1984 cannot be displayed.



↓Actual insertion starts here.

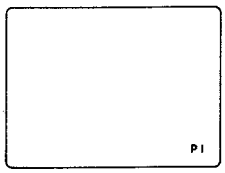
7 Press the INSERT key.
- The title zone and flashing cursor will disappear.
- Start recording; then the date will be recorded superimposed over the scene being recorded.
- To cancel date recording, press the DATE key. To re-start date recording, press the DATE key again.



Notes:
- Page 1 also accommodates a title of 3 lines x 12 characters. Procedure for inserting this title is identical to that described in the section "How to compose and insert a standard title" on page 11.
- If both the title and the date are to disappear from the screen, press the CHECK key. To display them again, press the INSERT key.
- If only the date is to disappear from the screen, press the DATE key. To display it again, press the DATE key again.
- To clear the title, first press the DATE key to cancel the date display, then press the CLEAR key. When the DATE key is pressed again, only the date is called up.
- If you want dating to be of larger characters, use standard title pages (P2 to P8) and compose a date in the same way as for titles.

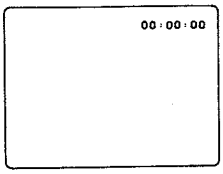
HOW TO INSERT THE LAP TIME (P1)

1 **Switch recorder power on. Page number will be displayed.**
- If the displayed page number is other than P1, call up P1 using the PAGE SHIFT key.



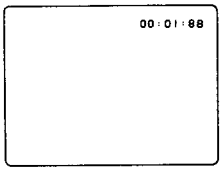
↓Actual insertion starts here.

2 **Press the INSERT key.**
- Lap time will be displayed.
- If the lap time does not appear, press the LAP key.
- If a no-longer-needed lap time reading appears, press the RESET key to obtain an indication of "00:00:00".

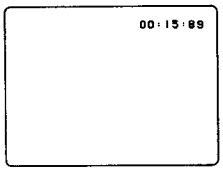


3 **Start recording.**

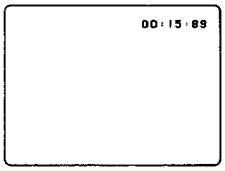
4 **Press the EXECUTE key at the point you want to start the stopwatch display.**



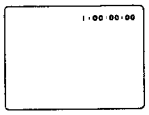
5 **To stop the stopwatch reading on the screen, press the STOP key.**



6 **If the EXECUTE key is pressed again, the cumulative lap time reading is obtained.**
- Press the RESET key first if you want to restart from 00:00:00.



Notes:
- Maximum lap time indication: 9:59:59:99.
- When the lap time exceeds one hour, the hour indication digit appears.
- Nothing is displayed in the hour position until after 59 minutes 59 seconds 99.

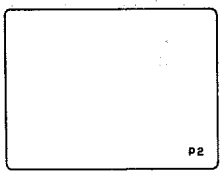


- To make the lap time disappear from the screen, press the LAP key. (Counting continues.) To display it again, press the LAP key again.
- If you want to have a title together with the lap time, press the CREATE key and compose a title following the procedure from step 3 on page 11.
- To make all displays (lap time, date and title) disappear from the screen, press the CHECK key. To display them again, press the INSERT key.
- If a title has been composed on P1, it is not possible to make the title disappear and keep the lap time displayed. Therefore, if you wish to insert the lap time only, do not compose any title on P1.

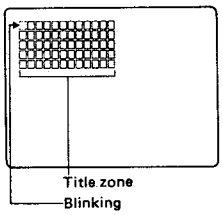
HOW TO COMPOSE AND INSERT A STANDARD TITLE (P2 – P8)

1 **Switch recorder power on.**
- Page number will be displayed on the screen.

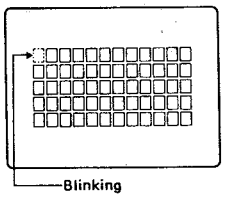
2 **Call up one of the pages P2 to P8 with the PAGE SHIFT key.**



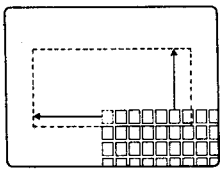
3 **Press the CREATE key.**
- Title zone will appear.
- If a no-longer-needed title has been already entered, erase it by pressing the CLEAR key.
- If a title to be preserved appears, call up the next page by pressing the PAGE SHIFT key.



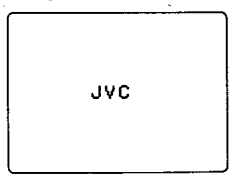
4 **Select the character size by pressing the SIZE key.**
- If you want to use the small characters, first compose the title with medium characters for easier composition and then switch to "small".
- If you are going to shift the character size during recording, be sure to compose the title in the largest character size that will be used later when recording.



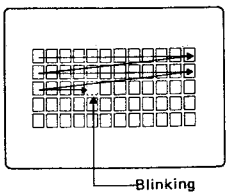
5 **Position the title zone at the centre of the screen with the TITLE POSITION key so that no part of the title zone runs off the screen.**



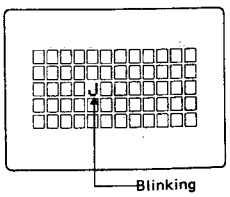
The following describes procedure necessary to compose the title shown to the right.



6 **Advance the cursor with the CURSOR RIGHT key to the position where the first character of the title is to be located.** (In this example, 3 lines from top and 5 character positions from left.)

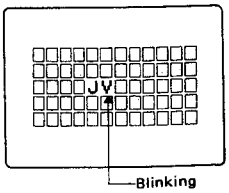


7 **Call up the required character with the CHARACTER SELECT key.** (In this example, "J".)
- Depending on the character to be called up, press either the FWD or REV side of the CHARACTER SELECT key. See page 6.

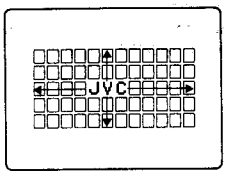


8 **Advance the cursor one character position and call up the next character.** (In this example, "V".)

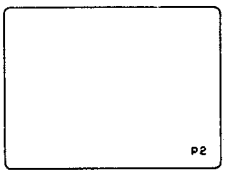
9 **Repeat steps 7 and 8 to finish composition.**



10 **After having composed the title, relocate it at a position you want it to be inserted on the screen.**
- If you are going to change the character size, first determine the size and then relocate the position.



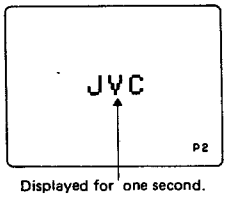
11 **Press the CHECK key.**
- The title zone will disappear and the page number will appear at the bottom right corner.
- This memorised entering one title into memory.
(In this example, the title "JVC" has been memorized on page 2.)



↓Actual insertion starts here.

12 **To insert a title during recording, call up the page that contains the title to be inserted with the PAGE SHIFT key.**

13 **If you are uncertain of the title held in memory on each page, press the CHECK key.**
- The title corresponding to the called-up page will be displayed for one second.



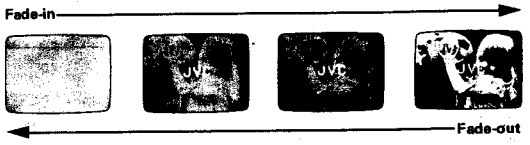
Displayed for one second.

14 **Press the INSERT key at the point you want the title to be recorded, superimposed on the scene being recorded.**
- Even though displayed on the viewfinder while the scene is being recorded, no title is actually recorded in steps 1 through 13.)

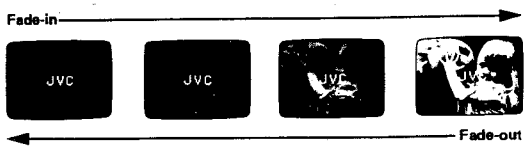
15 **To stop recording of only title and make it disappear from the screen, press the CHECK key.**

Notes:
- If the PAGE SHIFT key is pressed while one title is being recorded, another title on the next page will appear and be recorded.
- If the TITLE POSITION key is pressed while the title is being recorded, the title position will shift as usual and be recorded.
- If the SIZE key is pressed while the title is being recorded, the character size will be changed as usual and be recorded.
- If the CREATE key is pressed while the title is being recorded, the screen changes to the composition mode with the cursor blinking at the first character position. This is not recorded.
- All other keys (except CHECK) do not function during actual recording of a title.

Applicable techniques in combination with fading
- When white fade is applied during insertion of a title, the picture and the title fade in or out simultaneously.



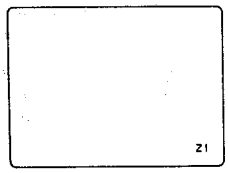
- When black fade is applied during insertion of a title, only the picture fades in or out. When the picture has faded out, the white title remains on the black blank screen.



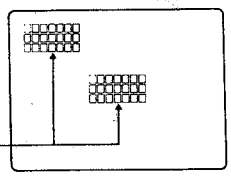
HOW TO COMPOSE AND INSERT A ZOOM TITLE (Z1 – Z4)

1 **Switch recorder power on.**
- Page number will be displayed.

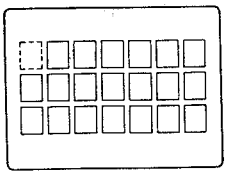
2 **Call up one of the pages Z1 to Z4 with the PAGE SHIFT key.**
- The four zoom page indications are initially Z1 to Z4, but can be changed to RZ1 to RZ4, depending on the chosen zoom effect in step 6. For RZ1 to RZ4 indications, refer to step 7.



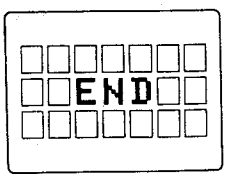
3 **Press the CREATE key.**
- Title zone will be displayed.
- With pages RZ1 to RZ4, a full-screen title zone will appear.



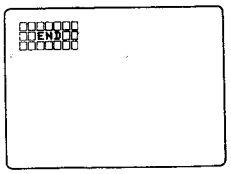
4 **Press either ZOOM key.**
- The title zone will zoom up.
- If title zone is already zoomed up, this step should be omitted.



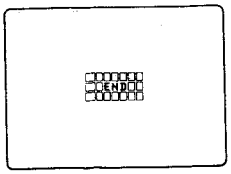
5 **Compose a title in the manner described in the section "How to compose and insert a standard title" on page 11.**



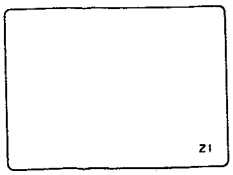
6 **Operate the ZOOM keys depending on the required zoom effect.**
① To zoom up from the upper left corner, press the ZOOM 1 key.
(Corner zoom-up standby)



② To zoom up from the centre, press the ZOOM 2 key.
(Centre zoom-up standby)
③ For zoom-back standby, leave the full-size title as it is.

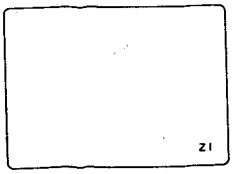


7 **Press the CHECK key.**
- The title zone will disappear and the page number will appear at the bottom right corner: Z1 to Z4 in the zoom-up standby mode or RZ1 to RZ4 in the zoom-back standby mode, depending on the chosen zoom effect in step 6.
- This completes entering a zoom title into memory.

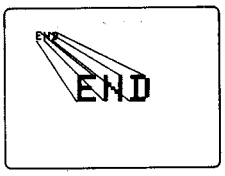


↓Actual insertion starts here.

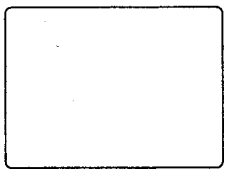
8 **To insert a zoom title during recording, call up, with the PAGE SHIFT key, the page that contains the zoom title to be inserted.**
- To check the contents of the title, press the CHECK key. The called-up title will be displayed for one second.



9 **Press the INSERT key at the point you want the zoom title to be recorded and then press either the ZOOM 1 or 2 key depending on the desired zoom mode (corner or centre).**
- Now, the zoom title is recorded.

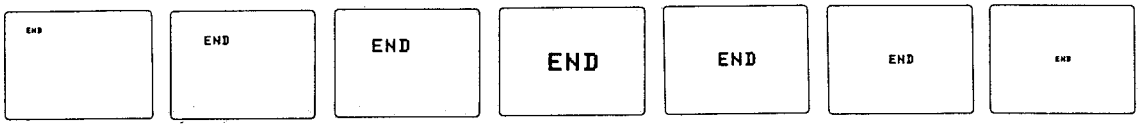


10 **To stop recording the zoom title only and make it disappear from the screen, press the CHECK key.**

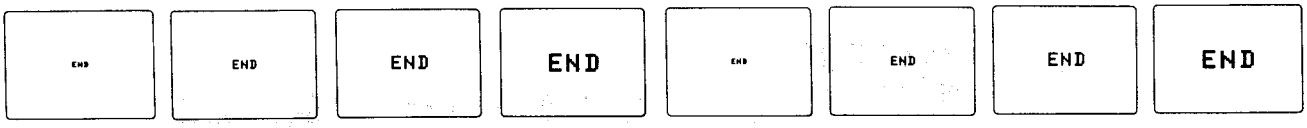


Special applications

Zooming up from the corner and zooming back to the centre.
- While recording, first press the ZOOM 1 key until the title reaches the largest character-size; then in succession, press the ZOOM 2 key until the smallest character-size title appears.

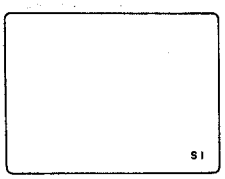


Repeating the same zoom-up effect.
- Press the SIZE key when the title is zoomed up to maximum; the zoom-up standby mode will be engaged. Press either ZOOM key again. Repeating these steps provides the same zoom effect as many times as desired.

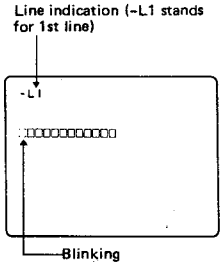


HOW TO COMPOSE AND INSERT A SCROLL TITLE (S1 and S2)

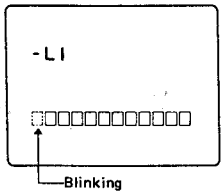
1 **Switch recorder power on and press the SCROLL key.**
S1 or S2 will be displayed on the screen.
- To change the page, press the SCROLL key once again.



2 **Press the CREATE key.**
The title zone for the first line and the line indication will appear.
- If a no-longer-needed title has already been entered, it is possible to compose a new title over the old title, or erase the old one. To erase, call up 4 lines at a time by pressing the CURSOR key and press the CLEAR key.
(Pressing the CLEAR key erases only those 4 lines appearing on the screen.)

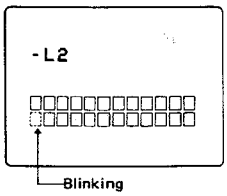


3 **Press the SIZE key to enlarge the title zone for easier composition.**
- If you want to use the small characters, compose the title with medium characters and then switch to "small".
- Only small and medium characters can be used for scroll titles.
- If any part of the title zone runs off the screen, adjust the position with the TITLE POSITION key.

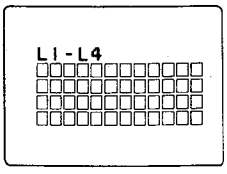


4 **Compose a title in the manner described in the section "How to compose and insert a standard title".**

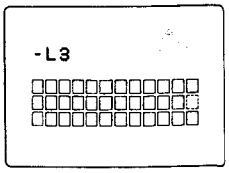
5 **When the CURSOR (RIGHT) key is pressed at the end of the 1st line (the 12th character position of the 1st line), the 2nd line will appear.**



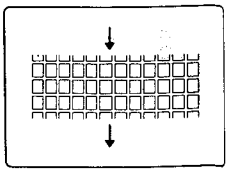
6 **When the 4th line is reached, the line indication shows the top and bottom line numbers such as L1 – L4.**
- Up to 37 lines can be stored.
- When the last possible line is reached, the line indication will be L34 – L37. Pressing the CURSOR (RIGHT) key at this point only repeats the last line.



7 **To return to the next line above, press the CURSOR (LEFT) key.**
- After the leftmost character blinks, the cursor will move to the rightmost character position on the next line above.



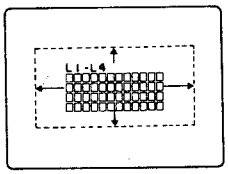
8 **After having composed a desired number of lines, press the REVERSE key and then the EXECUTE key. The composed title will appear while scrolling backward.**
- If you have found any mistake, press the STOP key and make the necessary correction. Then press the EXECUTE key to continue proofreading.



9 **After having proofread the text, obtain the first 4 lines on the screen by pressing the EXECUTE key and then press the STOP key.**

Determine the character size and title position at this point.

- Either small or medium characters can be selected.
- Size selection is not possible while scrolling.
- Position shifting is possible while scrolling.



10 **Press the EXECUTE key again and adjust the scroll speed with the SPEED UP or SPEED DOWN key.**

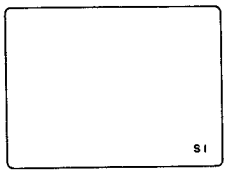
- Scroll speed is adjustable in 5 steps.

Pressing either key once gives a corresponding one-step faster or slower speed.

11 **Press the REVERSE key and then the EXECUTE key to scroll back until the first line disappears from the screen.**

12 **Press the CHECK key.**

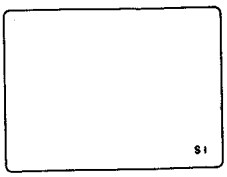
This permits the composed scroll title to be stored in memory.



↓ Actual insertion starts here.

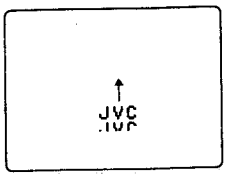
13 **To insert a scroll title during recording, press the SCROLL key to call up the desired scroll title page (S1 or S2).**

- S1 and S2 alternates with each pressing of the key.



14 **Press the INSERT key at the point you want the scroll title to be recorded (page number will disappear) and then press the EXECUTE key.**

- The scroll title will appear, beginning with the first line, and be recorded.
- To stop scrolling, press the STOP key.
- To restart scrolling, press the EXECUTE key.

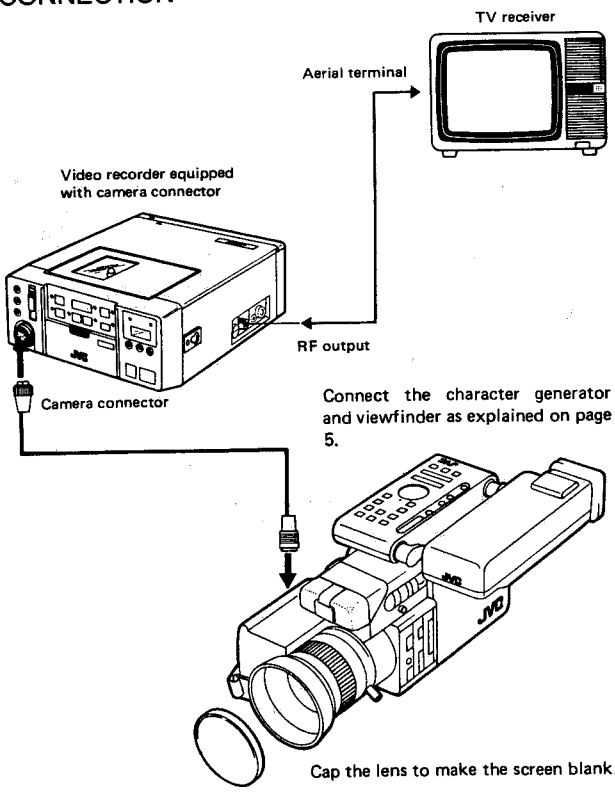


Notes:

- Scroll titles using small characters may appear coloured on the screen.
- To check or edit the content of scroll titles, call up the desired scroll title page (S1 or S2) with the SCROLL key and then press the CREATE key to engage the composition mode.
- To reverse the scrolling direction, press the REVERSE key. When the REVERSE key is pressed during scrolling, the direction reverses each time it is pressed. When the key is pressed while scrolling is stopped, the direction changes only with every other pressing (the 1st, 3rd, 5th, ...)
- To change the page, first press the CHECK key and then press the SCROLL key.
- The two scroll page indications are initially S1 and S2, but can be changed to RS1 or RS2. To change from S1 or S2 to RS1 or RS2, simply press the REVERSE key while in the Create mode, then press the CHECK key. Now with an RS1 or RS2 indication, the composed titles will be recorded scrolling downward when the EXECUTE key is pressed in the Insert mode.
- With the RS1 or RS2 indication, pressing the REVERSE key alternates the scrolling indications (i.e., RS1, S1, RS1 . . . or RS2, S2, RS2 . . .); and pressing the SCROLL key twice cancels the RS1 or RS2 indication completely.

MONITORING THE COMPOSING PROCESS ON THE TV SCREEN

CONNECTION


TV receiver
Aerial terminal
Video recorder equipped with camera connector
RF output
Camera connector
Connect the character generator and viewfinder as explained on page 5.
Cap the lens to make the screen blank.

OPERATION

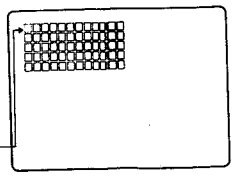
1 **Switch power on for the video recorder and TV receiver.**

- Set the TV receiver to your video channel.

2 **Call up the page on which you want to compose a title referring to the viewfinder.**

3 **While pressing the MONITOR key, press the CREATE key.**

- The title zone will appear on the TV screen.



4 **Compose the title in the same manner as described on previous pages. There is only one difference: whenever pressing the CREATE key is required, press it while holding the MONITOR key pressed.**

REPLACING THE BATTERIES

Replace the batteries once a year (every 12 months).
Replacement batteries are two disc-batteries. Ask for LR-43 batteries at your local electric appliance or camera shop.

CAUTION
When the batteries are depleted, all memorised titles will be cleared. Make it a rule to replace the batteries a bit earlier than necessary.

- The provided batteries may discharge before 12 months from your purchase of the CG-P50E have elapsed. In such a case, the memorised titles could be cleared before the one-year period has passed.

HOW TO REPLACE THE BATTERIES

1 **Make the same connections as required for titling and switch the recorder power on.**
- Do not mount the character generator on the camera. (Do not connect the viewfinder.)

2 **Allow for about 5 minutes after switching the recorder on. Then remove the battery compartment cover and take out the depleted batteries.**
- If you take the batteries out before 5 minutes have elapsed, the memory will be cleared.
- Refer to page 4 for removal of the battery compartment cover.

3 **Install the new batteries.**
- Be sure to replace both batteries with fresh ones at the same time.
- Do not use batteries other than the LR-43.

Notes
- This character generator incorporates a memory backup system which holds the memorised titles for about one hour without batteries so that they should not be erased during replacement of the batteries. However, if the wrong procedure should be followed, the backup system cannot function.
- The backup system functions only when the connected video recorder power is on. If you attempt to replace the batteries with the character generator not connected to the video recorder or with the video recorder switched off, all the memory will be cleared.

PRECAUTIONS REGARDING THE DISC-BATTERIES

CAUTION
KEEP DISC-BATTERIES AWAY FROM CHILDREN. IF ONE SHOULD BE SWALLOWED BY A CHILD, IMMEDIATELY CONTACT A DOCTOR.

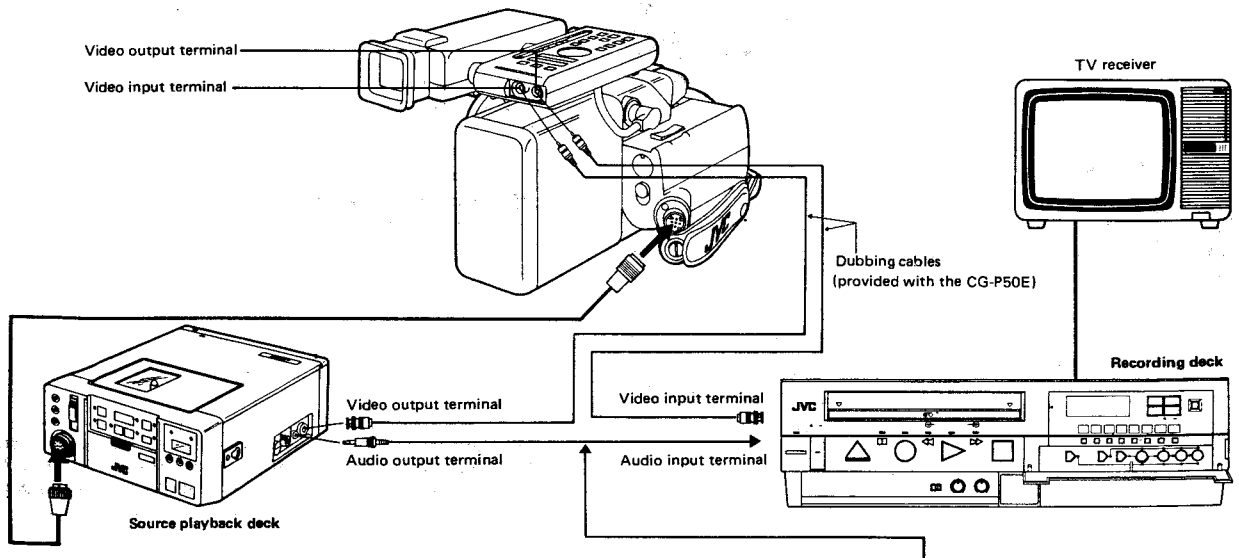
- To avoid any possibility of explosion or leakage of chemicals, observe correct polarities when inserting the batteries.
- Do not attempt to recharge, short-circuit or disassemble the batteries. Do not heat or put them in a fire.
- Do not use a fresh battery together with a used one.

INSERTING TITLES DURING TAPE-TO-TAPE TRANSFER

Using two video recorders, it is possible to insert titles and dates into prerecorded tapes while editing.

CONNECTION

Connect the character generator to the camera as described on page 5.



Necessary equipment
- For a source playback deck, you need a video recorder equipped with a camera connector.
- For a camera, you should use a JVC video camera. (Some JVC camera models are not compatible with this configuration.)

No audio cable provided. A standard audio cable is available at audio shops.

OPERATION

1 **Make connections correctly as illustrated.**

2 **Compose titles and dates in the same manner as described on previous pages.**
- When you have composed titles while monitoring on the TV screen, be sure to make the titles disappear by pressing the CHECK key at the end of composition.

3 **Call up, with the PAGE SHIFT or SCROLL key, the page corresponding to the title you wish to insert, referring to the viewfinder.**
- No page number is displayed on the TV screen.

4 **Operate the source playback deck for playback and the recording deck for recording to start dubbing.**

CAUTION
- Insertion of a title on the playback picture during shuttle search is not possible.

5 **Press the INSERT key at the point you want the title to be inserted.**
- This permits the title to be recorded on the new tape together with the playback picture from the source playback deck.
- If the INSERT key is pressed before the playback deck reaches its steady state of operation, the title may not be inserted.
- To make the title disappear, press the CHECK key.
- Call up the next required page and continue dubbing with the next title insertion in standby. If the PAGE SHIFT key should be pressed before the CHECK key is pressed, the next title will be immediately recorded. To avoid this, first press the CHECK key and then call up the next page. (While the playback signal is being fed from the playback deck, no sign is available on the screen to indicate in which mode (standby, check or composition mode) you are. Therefore, to select the page, stop playback.

6 **Referring to the viewfinder, insert the next title in the same manner as in step 5.**

7 **Repeat steps 5 and 6 as many times as necessary.**

SPECIFICATIONS

Number of characters	: 46
Display capacity	: Maximum 60 characters (12 characters x 5 lines)
Character sizes	: 4 different sizes (small, medium, large, extra-large)
Number of pages	: 2 scroll pages, 4 zoom pages and 8 standard title pages
Lap timer	: Counts in 1/100 sec (up to 9 hours 59 minutes 59 seconds 99)
Memory	: One-year backup with two disc-batteries
Power supply	: DC 8 – 8.5 V ⎓ for operation (supplied from camera) DC 3.0 V ⎓ for memory (supplied from two LR-43 disc-batteries)
Dubbing	: Possible through VIDEO IN/OUT connectors
Power consumption	: 255 mW
Dimensions	: 57(W) x 26.5(H) x 137(D) mm
Weight	: 115 g (including batteries)
Accessories	: Cable (8-pin, 30 cm) x 1 Cable (RCA pin-BNC, 2.5 m) x 2 Alkaline-manganese battery LR-43 x 2

Design and specifications subject to change without notice.

JVC

VICTOR COMPANY OF JAPAN, LIMITED

JAN4 Printed in Japan
PU30425 619

1. DISASSEMBLY

1. Take out screw (34) indicated in Fig. 1-1. Open the battery cover (3) and remove the batteries.
2. Take out 2 screws (33) . The bottom case can then be removed.

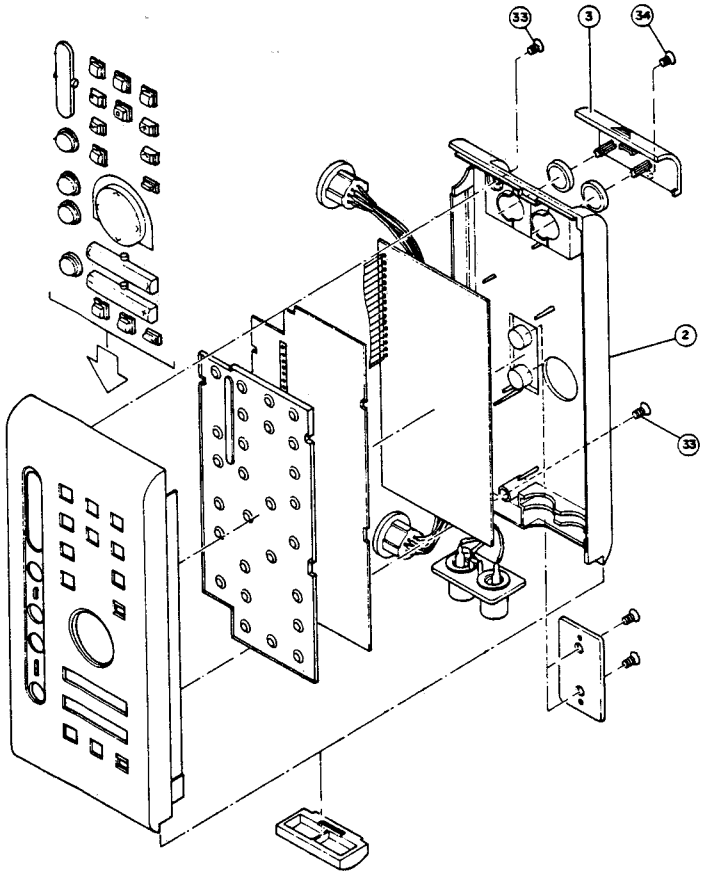


Fig. 1-1

2. ADJUSTMENT

1. Remove the bottom case and batteries.
2. Connect the character generator to camera and electronic viewfinder.
3. Supply power. Press the PAGE SHIFT key to obtain a zoom page (Z1 to Z4, or RZ1 to RZ4) display on the electronic viewfinder.
4. Press the CREATE key. The title matrix will appear in the viewfinder display. Press the ZOOM 2 key for maximum enlargement of the matrix display.
5. Adjust VR1 so that the space between the right edge of the matrix becomes approximately equal to the spaces between the matrix columns. See a and b in Fig. 2-1.

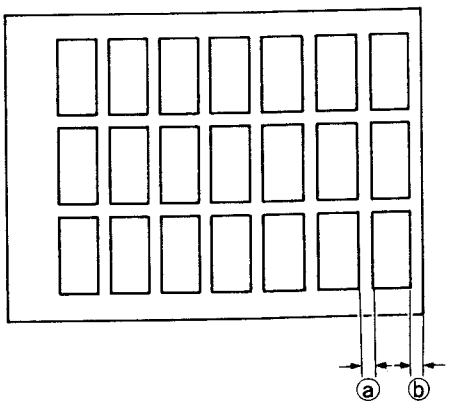


Fig. 2-1

3. CIRCUIT DESCRIPTION

This unit operates in conjunction with the model GZ-S5 color video camera and functions to insert indications for title, date, lap time, etc. into the video picture. Internal circuits consist of sync separator, vertical sync separator, keyboard, memory, controller, character generator and three control gates.

There are two principal methods of use, as indicated in Figs. 3-1, and 3-2. One is for inserting titles into the picture produced by the video camera for recording with a connected video tape recorder (VTR). The other method is for inserting titles during dubbing operation with two VTRs. In both cases, the character generator unit is inserted between the electronic viewfinder connector of the camera and the electronic viewfinder itself.

3.1 Camera to VTR (Fig. 3-1)

The luminance "wide" (Yw) and chrominance (chroma) signals are mixed within the camera and sent through the fader circuit to become the CVBS (chroma, video, burst and sync) signal. This signal goes through the playback detector, then in one line via CN-A1 to the VTR for recording. In another route, it is sent form CN-V1 to CN-2 of the character generator unit.

Within the unit, the signal is again branched to go in one line to the viewfinder and in the other to the circuits of the unit. The sync and vertical sync separators yield the synchronization component of the video signal, which is applied to the controller.

The controller performs data exchange with respect to the keyboard and memory. Based on instructions from the keyboard and memory, the controller instructs the character generator to produce the required characters in synchronization with the sync signal. These are then sent to control gates A, B and C.

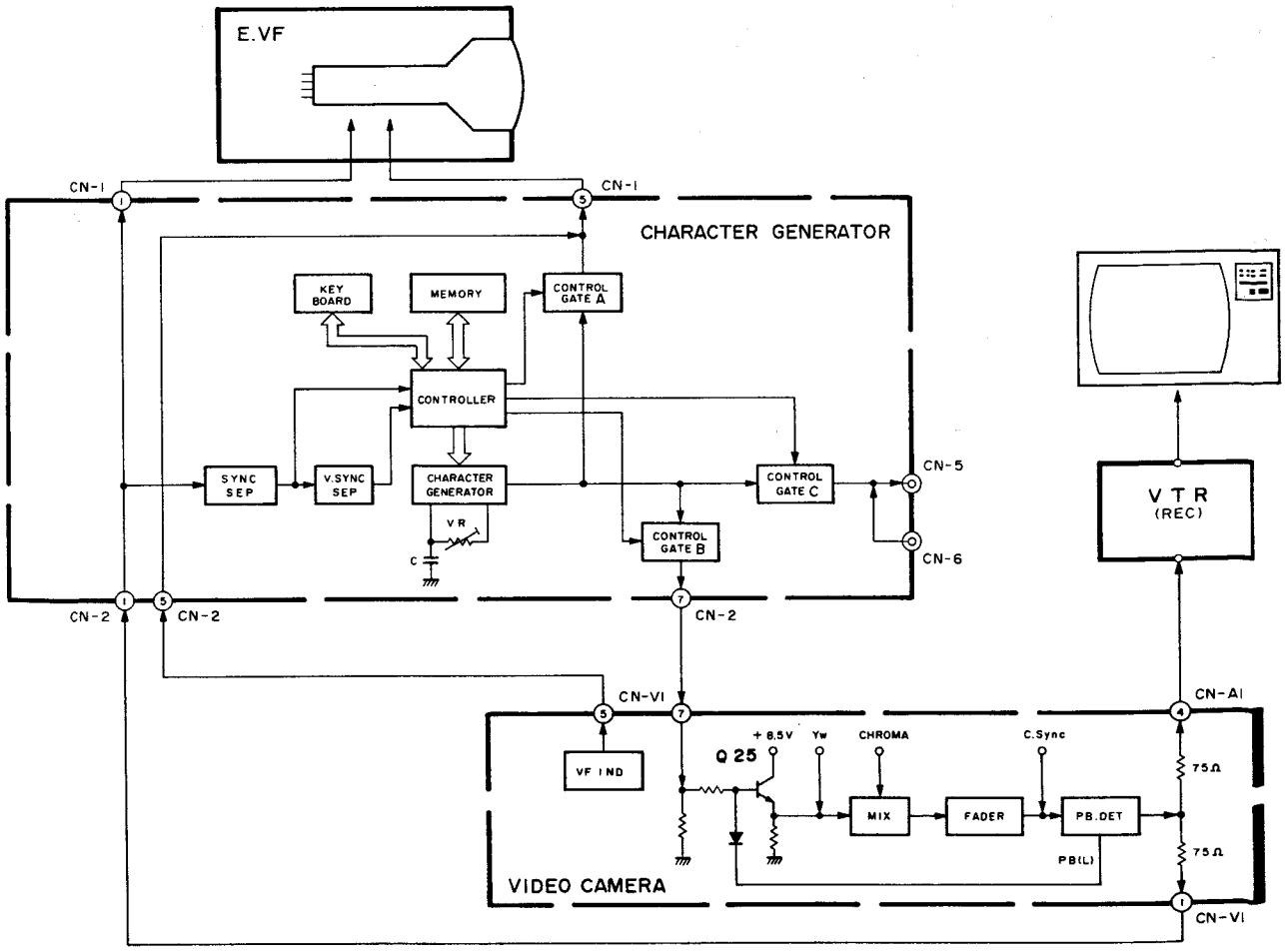


Fig. 3-1

The gates are also regulated by the controller. By opening gate B, the character signal is sent via CN-2 pin 7 and camera CN-V1 pin 7 to Q25, where it is combined with the Yw signal. After mixing with chrominance, composite sync is applied to yield the combined CVBS with character signal, which goes to camera connector CN-A1 pin 4.

The video with overlapped character signal is delayed by one horizontal line (1H) and supplied to the VTR for recording. At the same time, feedback is returned to the character generator. Consequently, the electronic viewfinder shows the "real time" camera subject with overlapped character information.

3.2 VTR to VTR (Fig. 3-2)

The video camera circuits are also used when employing this unit for dubbing between too VTRs. In this case, the character generator unit is connected between the playback and recording VTRs.

From the playback VTR, the video signal is routed via CN-6 and CN-5 of this unit to the recording VTR. During operation, the playback detector circuit of the camera cuts off the camera output signal.

The video signal goes from the camera connector CN-V1 pin 1 to CN-2 pin 1 of this unit. Consequently, the playback video signal becomes the synchronization source during the dubbing operation.

The character signal processed through control gate C becomes mixed directly with the video signal between CN-6 and CN-5.

Audio signal connections are performed directly between the VTRs.

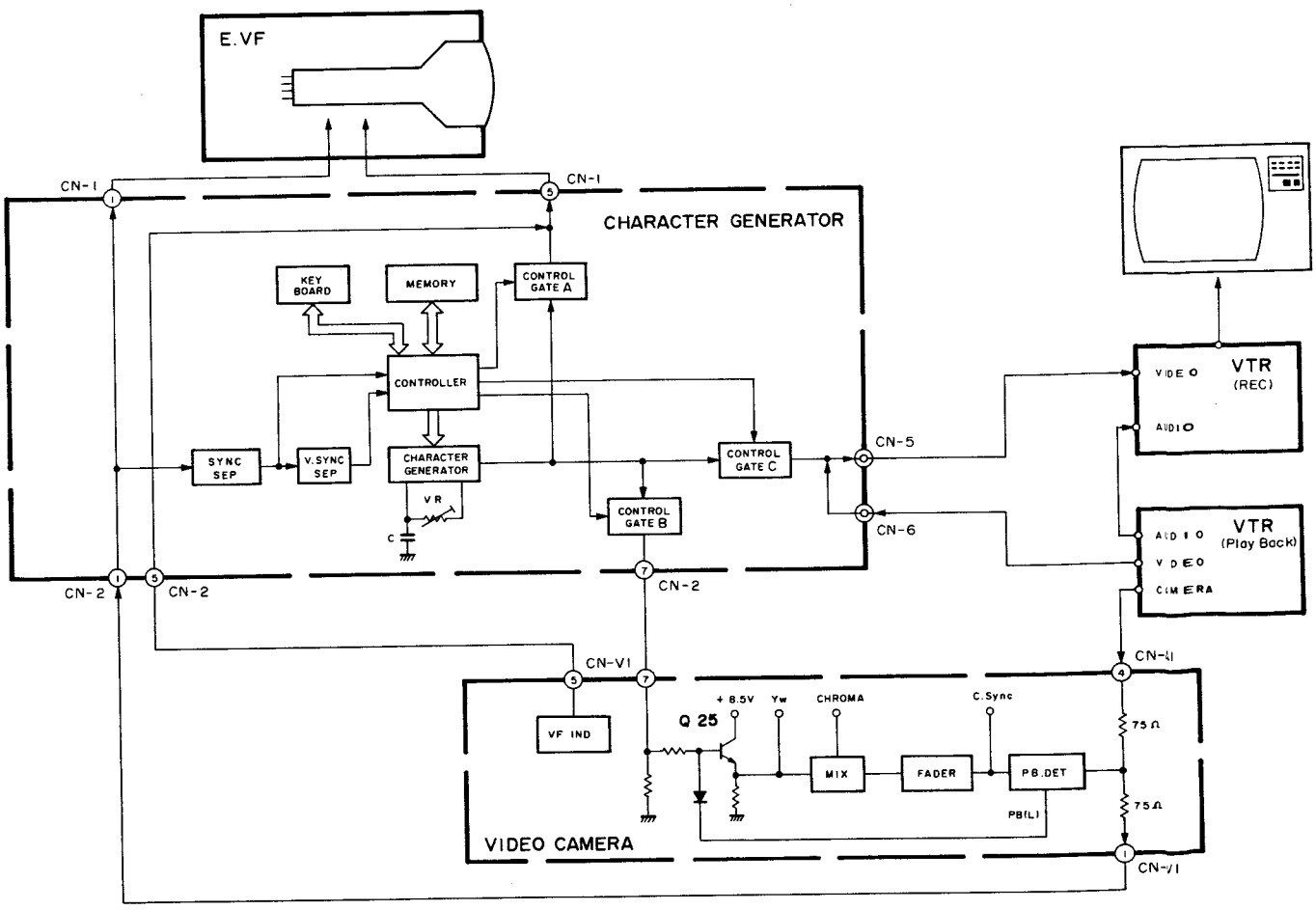


Fig. 3-2

3.3 Indicating modes

By keyboard commands, the controller can select the following indicating modes.

1) Create

This produces the title information in the electronic viewfinder display. Control gate states at this time become as follows.

Gate	A	On
"	B	Off
"	C	Off

2) Insert

In the insert mode, the characters produced during the create mode are inserted into the signal. At this time, character inputs from the keyboard are inhibited. The control gate states become:

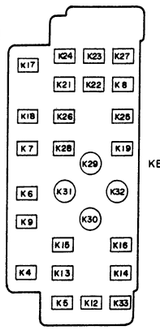
Gate	A	Off
"	B	On
"	C	On

3) Monitor

This allows performance of the create operation using a monitor-TV. Character inputs from the keyboard are possible.

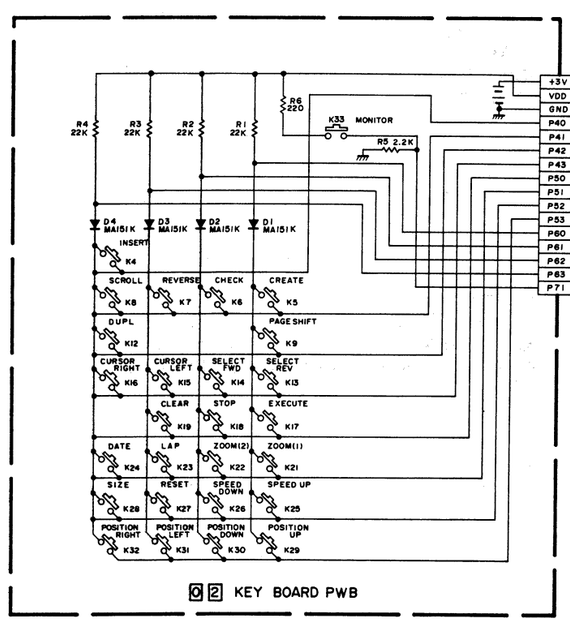
4. DIAGRAM AND CIRCUIT BOARDS

4.1 SCHEMATIC DIAGRAM

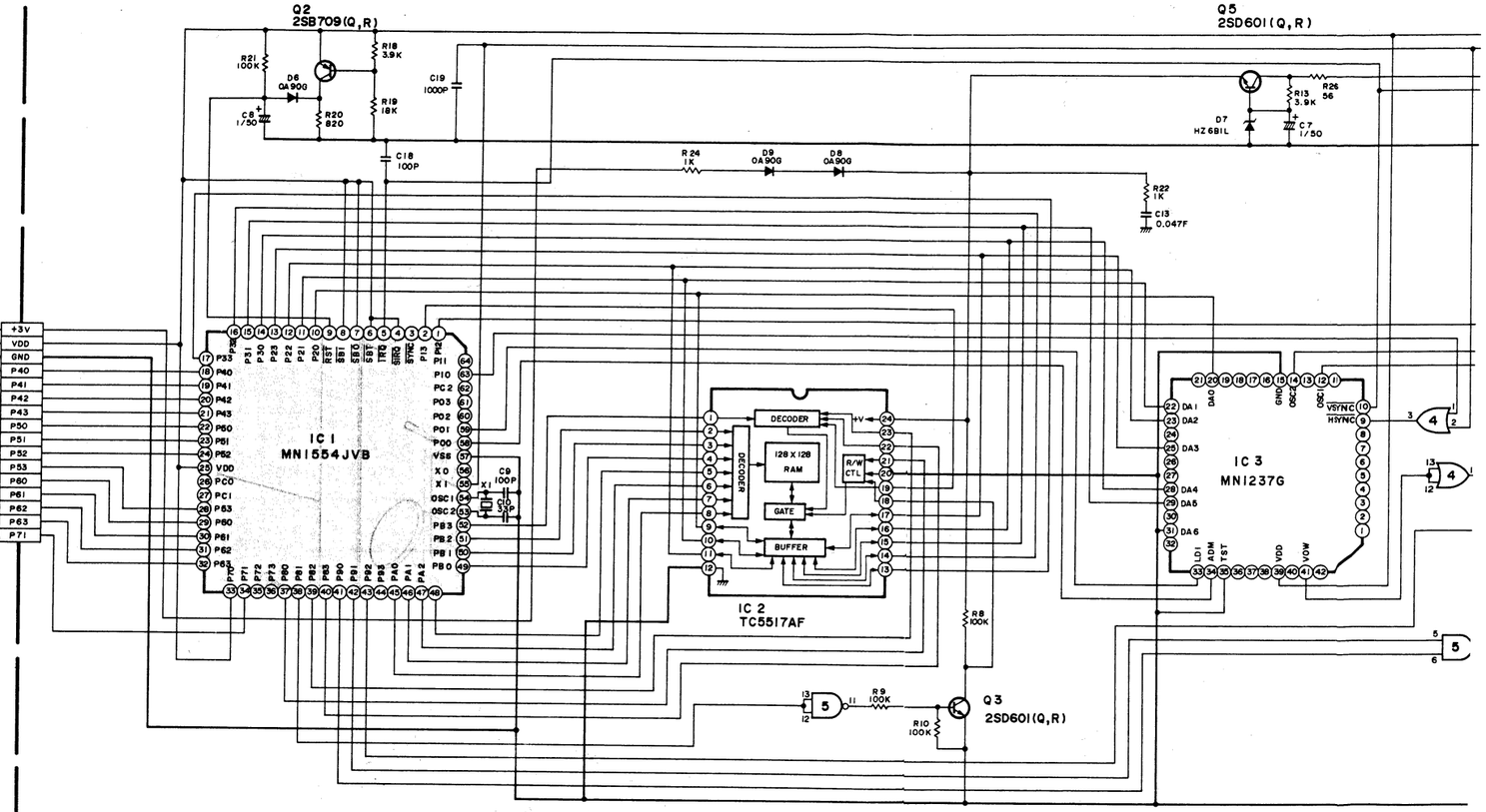


KEY POSITION

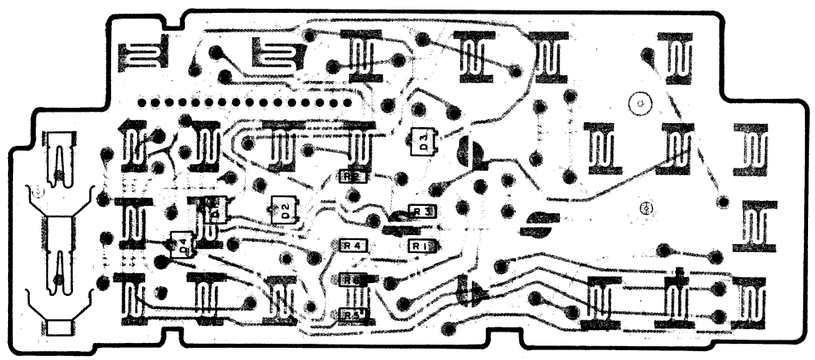
Note:
Shaded ( ) parts are critical for safety.
Replace only with specified part numbers.



02 KEY BOARD PWB

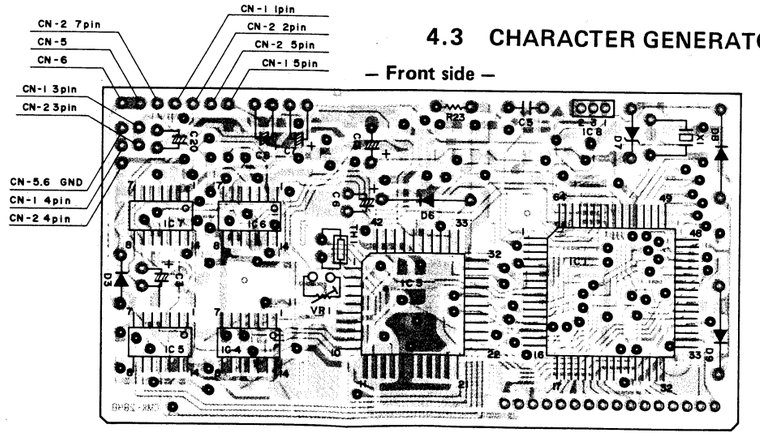


4.2 KEY BOARD

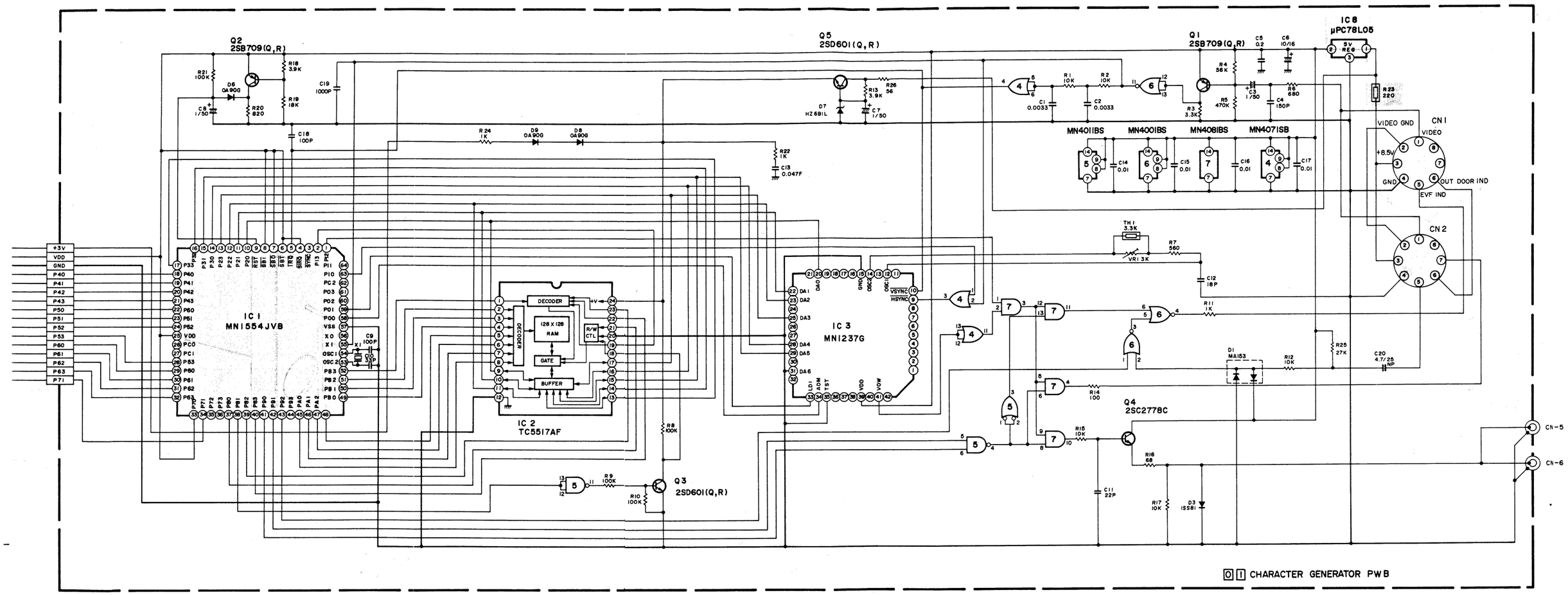


4.3 CHARACTER GENERATOR CIRCUIT BOA

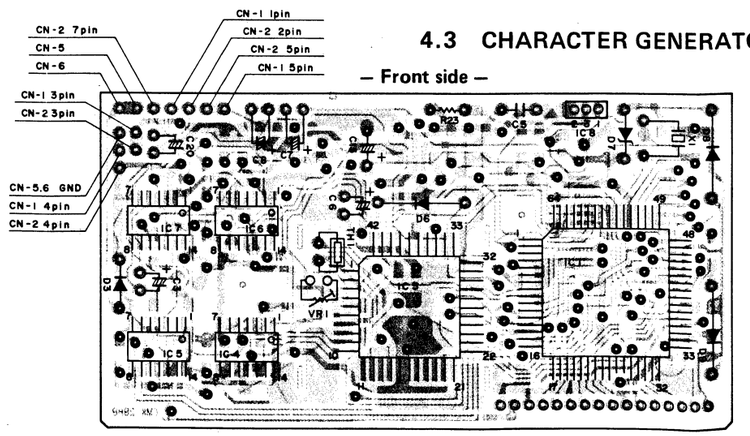
– Front side –

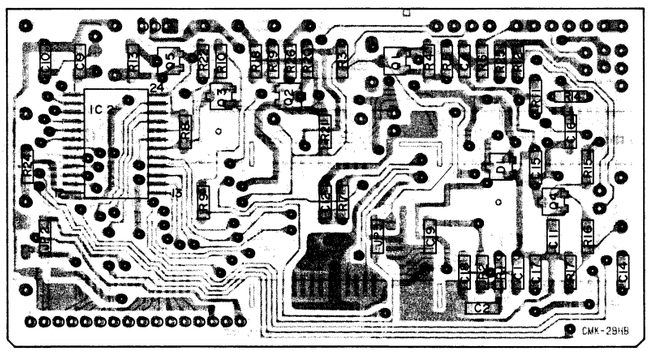


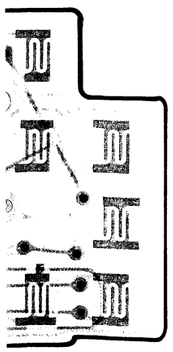
5 DIAGRAM AND CIRCUIT BOARD



4.3 CHARACTER GENERATOR CIRCUIT BOARD





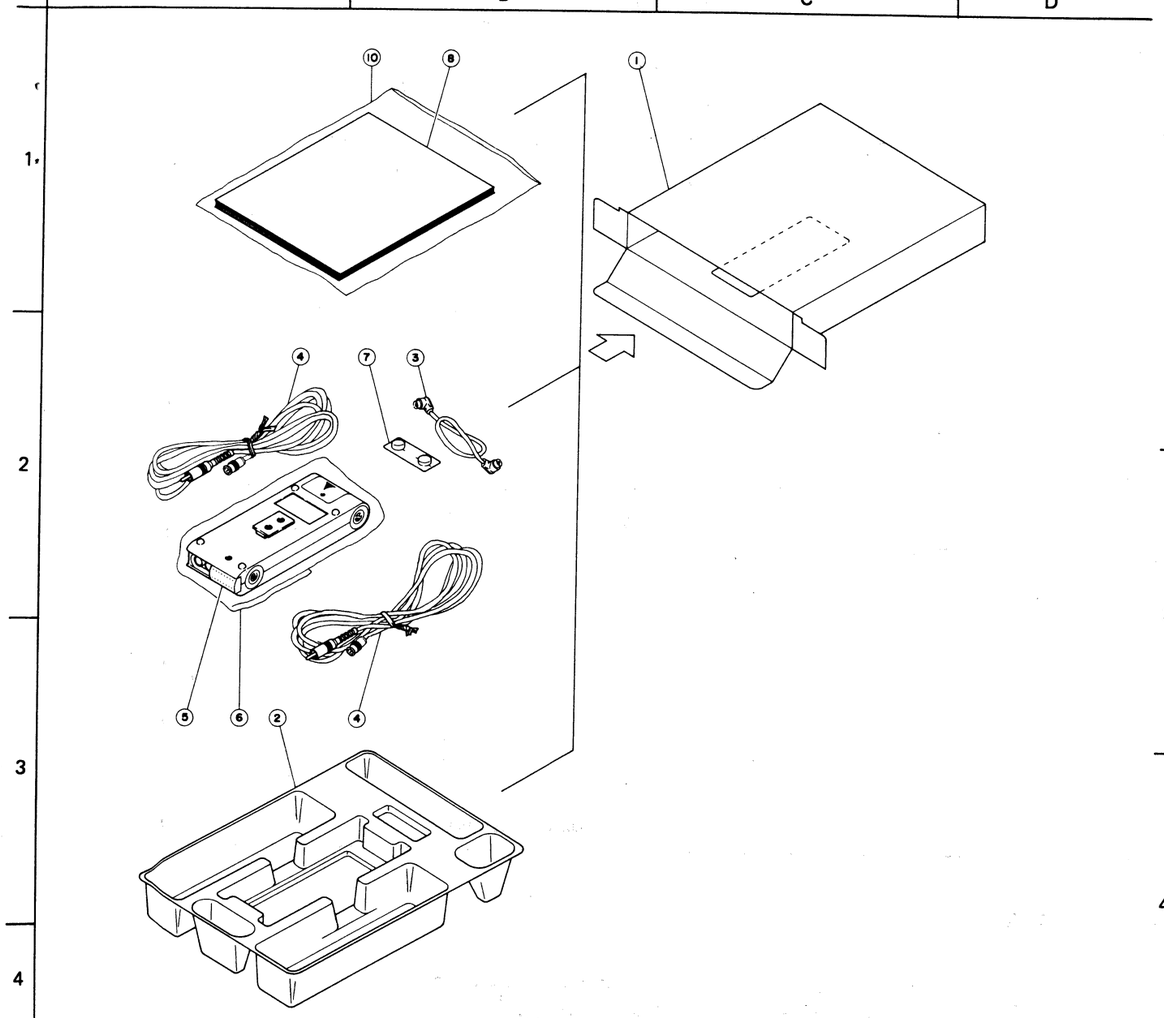


5. EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

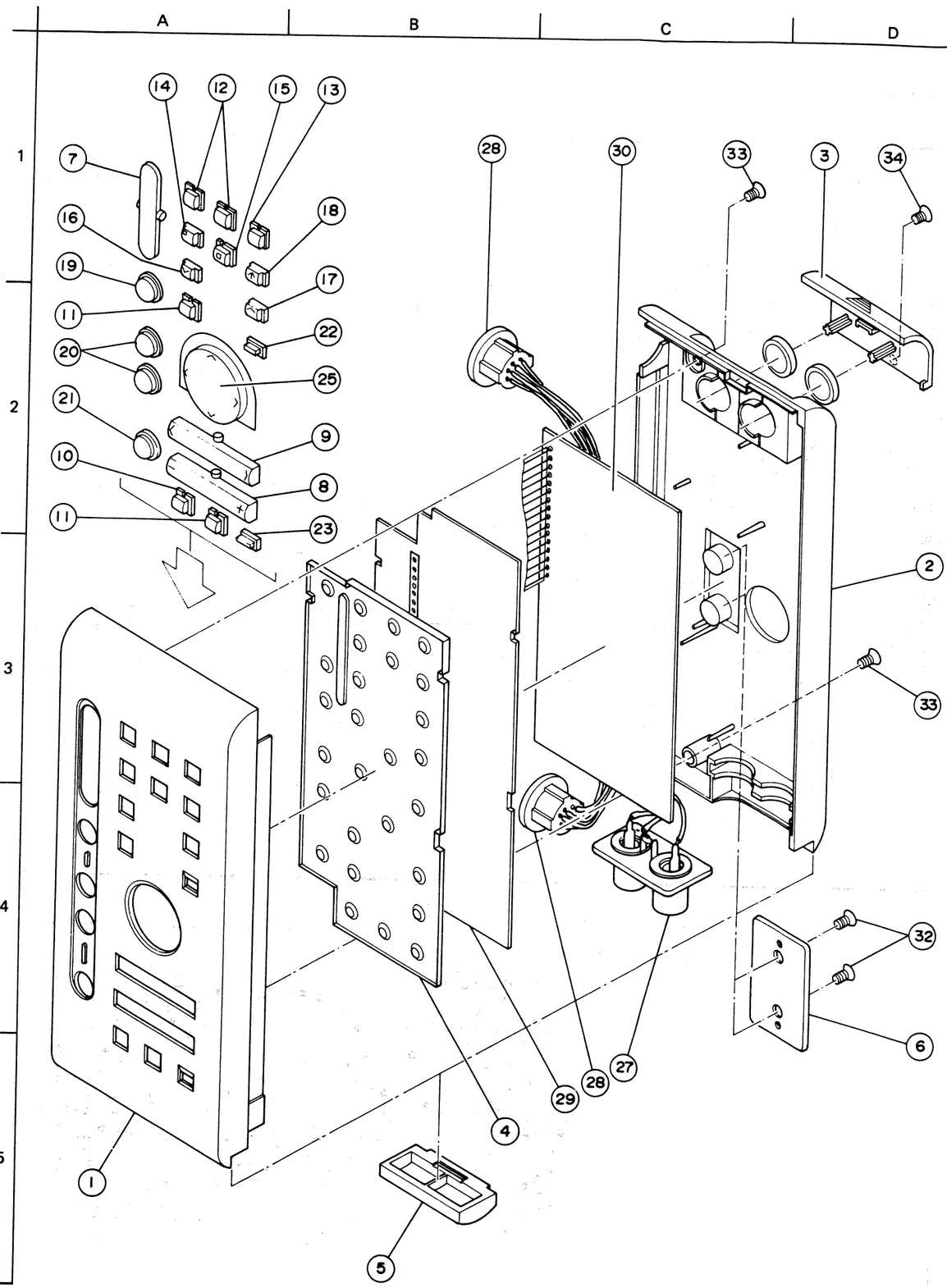
5.1 PACKING ASSEMBLY



– Packing assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	PU56314-059	Packing Case		1	1-B
2	" -039	Cushion		1	3-A
3	PU56390	Cable Ass'y		1	2-B
4	PU56780	Pin Jach Cable		2	2-A, 3-B
5	–	–	CG-P50E	1	3-A
6	QPGA010-02003	Poly Bag		1	3-A
7	LR43-2P	Battery		1	2-B
⚠ 8	PU30425-615	Instructions		1	1-B
9	–	–		–	–
10	QPGA025-03505	Poly Bag		1	1-B

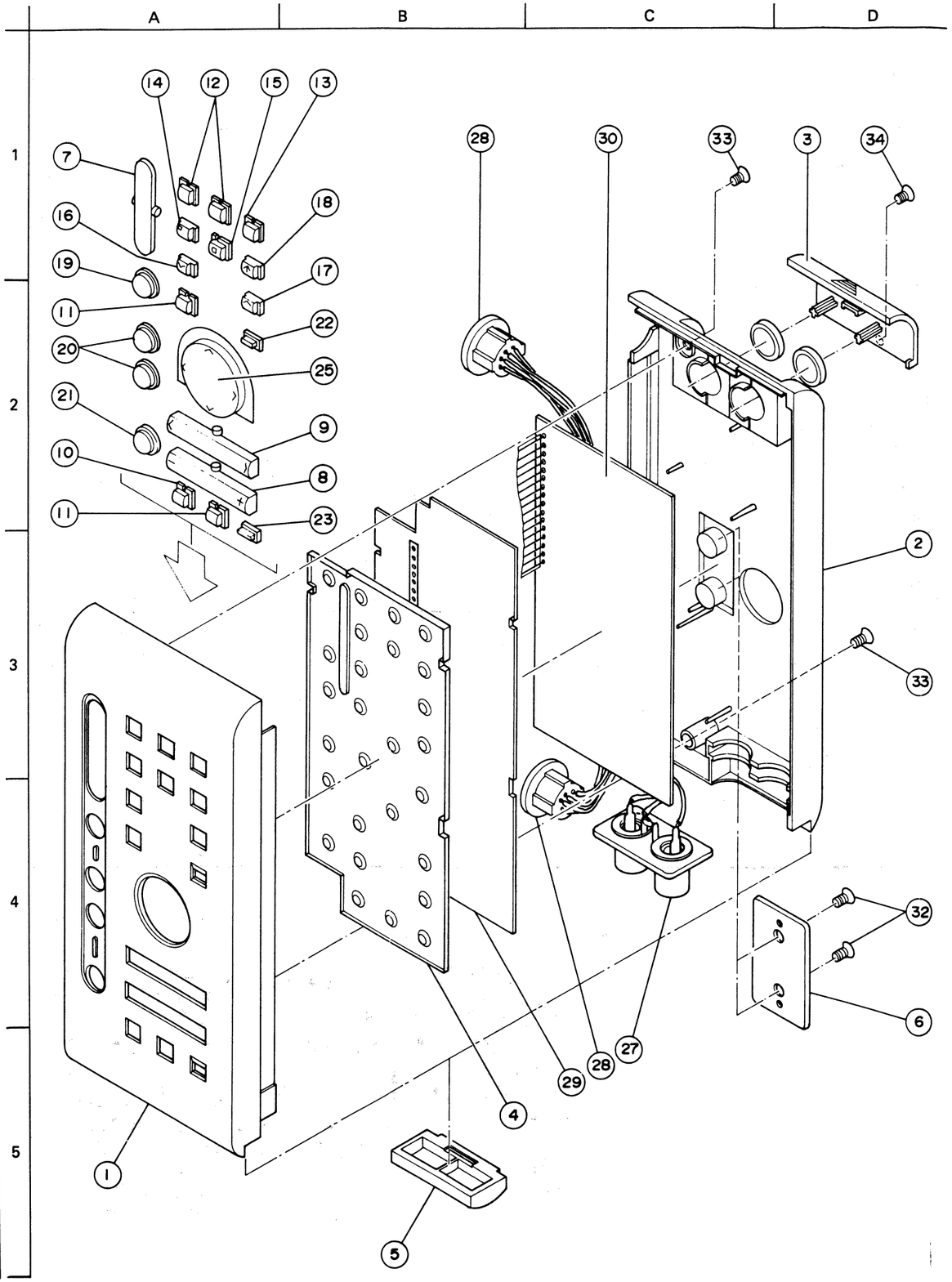
5.2 CABINET ASSEMBLY



– Cabinet assembly li

Symbol No.	Part
⚠ 1	PU56314-
⚠ 2	"
⚠ 3	"
4	"
5	"
6	"
7	"
8	"
9	"
10	"
11	"
12	"
13	"
14	"
15	"
16	"
17	"
18	"
19	"
20	"
21	"
22	"
23	"
24	–
25	PU56314-
26	–
27	PU56314-
⚠ 28	"
29	–
30	–
31	–
32	PU56314-
33	"
34	"

5.2 CABINET ASSEMBLY



Symbol No. Position
1-B
3-A
2-B
2-A, 3-B
3-A
3-A
2-B
1-B
—
1-B

— Cabinet assembly list —

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
⚠ 1	PU56314-056	Upper Case		1	5-A
⚠ 2	" -065	Bottom Case		1	3-D
⚠ 3	" -003	Battery Compartment Cover		1	1-D
4	" -004	key-top Rubber		1	5-B
5	" -057	Slide Cover		1	5-B
6	" -006	Plate		1	4-D
7	" -007	EXECUTE/STOP key		1	1-A
8	" -008	CHARACTER SELECT key		1	2-B
9	" -009	CURSOR key		1	2-B
10	" -010	CREATE key		1	2-A
11	" -011	DUPL/SISE key		2	2-A
12	" -012	DATE/LAP key		2	1-A
13	" -013	RESET key		1	1-A
14	" -014	ZOOM 1 key		1	1-A
15	" -015	ZOOM 2 key		1	1-A
16	" -016	DOWN key		1	1-A
17	" -017	UP key		1	1-B
18	" -018	SCROLL key		1	1-B
19	" -019	REVERSE key		1	1-A
20	" -020	CHECK/PAGE SHIFT key		2	2-A
21	" -021	INSERT key		1	2-A
22	" -022	CLEAR key		1	2-B
23	" -023	MONITOR key		1	2-B
24	—	—		—	—
25	PU56314-046	TITLE POSITION key		1	2-B
26	—	—		—	—
27	PU56314-027	Pin Jack		1	5-C
⚠ 28	" -047	Connector Ass'y		1	1-B,5-C
29	—	Key Board Ass'y	See Section 6.1.2	1	5-C
30	—	Character Generator Board Ass'y	See Section 6.1.1	1	1-C
31	—	—		—	—
32	PU56314-032	Tapping Screw		2	4-D
33	" -033	"		2	1-C,3-D
34	" -034	Screw		1	1-D

6

6. ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS – All resistance values are in ohms (Ω).

K	:	1 000
M	:	1 000 000
CR	:	Carbon Resistor
Comp. R	:	Composition Resistor
WR	:	Wire Wound Resistor
OMR	:	Oxide Metal Film Resistor
VR	:	Variable Resistor (Potentiometer)
MFR	:	Metal Film Resistor
FR	:	Fusible Resistor
PMR	:	Precision Metal Film Resistor

CAPACITORS – All capacitance values are in μF, unless otherwise indicated.

P	:	μμF
C Cap	:	Ceramic Capacitor
E Cap	:	Electrolytic Capacitor
FM Cap	:	Film Mica Capacitor
MM Cap	:	Metalized Mylar Capacitor
MP Cap	:	Metalized Paper Capacitor
MY Cap	:	Mylar Capacitor
NP Cap	:	Non-polar Capacitor
PC Cap	:	Polycarbonate Capacitor
PF Cap	:	Plastic Film Capacitor
PP Cap	:	Poly Pro Capacitor
PS Cap	:	Polystyrol Capacitor
T Cap	:	Tantalum Capacitor
TR Cap	:	Trimmer Capacitor

6.1 ELECTRICAL PARTS LIST BY ASSEMBLIES

6.1.1 Character Generator Circuit Board Ass'y

PU56314-106

Symbol No.	Part No.	Part Name	Description
⚠IC 1	MN1554JVB	IC	
IC 2	TC5517AF	"	
IC 3	MN1237G	"	
IC 4	MN4071BS	"	
IC 5	MN4011BS	"	
IC 6	MN4001BS	"	
IC 7	MN4081BS	"	
⚠IC 8	UPC78L05	"	
Q 1	2SB709QR	Chip Transistor	
Q 2	"	"	
Q 3	2SD601QR	"	
Q 4	2SC2778C	"	
Q 5	2SD601QR	"	
D 1	MA153	Chip Diode	
D 2	—	—	
D 3	1SS81	Diode	
D 4	—	—	
D 5	—	—	
D 6	OA90-G	Diode	
D 7	MA1056L	"	
D 8	OA90-G	"	
D 9	"	"	
R 1	QRS188J -103YN	Chip R	
R 2	" -103YN	"	
R 3	" -332YN	"	
R 4	" -563YN	"	
R 5	" -474YN	"	
R 6	" -681YN	"	
R 7	" -561YN	"	
R 8	" -104YN	"	
R 9	" -104YN	"	
R10	" -104YN	"	
R11	" -102YN	"	
R12	" -103YN	"	
R13	" -561YN	"	
R14	" -101YN	"	
R15	" -103YN	"	
R16	" -680YN	"	
R17	" -103YN	"	
R18	" -392YN	"	
R19	" -183YN	"	
R20	" -821YN	"	
R21	" -104YN	"	
R22	" -102YN	"	
⚠R23	PTH60BD220M	Posistor	
R24	PU56314-051	CR	
R25	QRS188J-273YN	Chip R	
R26	" -560YN	"	
C 1	QCF81HZ-332ZL	Chip Cap	
C 2	QCF81HZ-332ZL	"	
C 3	QEK41HM-105	E Cap	
C 4	QCF81HZ-151ZL	Chip Cap	
C 5	PU56314-052		
C 6	QEE41CM-106	T Cap	
C 7	QEK41HM-105	E Cap	
C 8	" -105	"	
C 9	QCF81HZ-101ZL	Chip Cap	
C10	" -330ZL	"	
C11	" -220ZL	"	
C12	" -180ZL	"	
C13	PU56314-053		
C14	QCF81HZ-103ZL	Chip Cap	
C15	" -103ZL	"	
C16	" -103ZL	"	
C17	" -103ZL	"	
C18	—	—	
C19	—	—	
C20	QEN41EM-475	NP Cap	
	PU56314-048	Flat Cable	
TH 1	ERTD2FHK332S	Thermistor	
J	QRS188J-0R0Y	Chip R	
VR 1	PU56314-049	Chip VR	
⚠X 1	" -050	X'tal Block	

6.1.2 Key Board Circuit Board Ass'y PU56314-029

Symbol No.	Part No.	Part Name	Description
D 1	MA151K	Chip Diode	
D 2	"	"	
D 3	"	"	
D 4	"	"	
R 1	QRS188J-223YN	Chip R	
R 2	" -223YN	"	
R 3	" -223YN	"	
R 4	" -223YN	"	
R 5	" -221YN	"	
R 6	" -222YN	"	
⚠	PU56314-036	Terminal (C)	
⚠	" -037	" (—)	
⚠	" -038	" (+)	